Dear Colleague:

This document summarizes the comments provided by the Peer Review Panel at the U.S. DOE Hydrogen Program FY 2004 Annual Merit Review, held on May 24-27, 2004 in Philadelphia, Pennsylvania. This was the first review that began to reflect the entire DOE Hydrogen Program, in response to direction from the Under Secretary for Energy, Science, & Environment. That direction requires that the Offices of Energy Efficiency and Renewable Energy (EERE), Fossil Energy (FE), Science (SC), and Nuclear Energy, Science, and Technology (NE) all participate in order to give the hydrogen community an overall view of the breadth and depth of DOE's effort in support of the President's Hydrogen Fuel Initiative. For the first time, representatives from FE, NE, and SC gave overview presentations on their program plans related to hydrogen at the merit review meeting. With the planned inception of hydrogen-related projects within these Offices in fiscal year (FY) 2005, future Hydrogen Program Annual Program Reviews will include projects by all Offices within DOE on hydrogen-related technologies.

The recommendations of the panel have been taken into consideration by DOE technology development managers in the development of work plans for FY 2005. The tables below list the projects discussed at the review and the major actions to be taken during the upcoming fiscal year. The projects have been grouped according to which activity area (production, delivery, storage, fuel cells, etc.) they support. The average scores are on a 4- point scale. To furnish all principal investigators (PIs) with direct feedback, raw evaluations and comments were provided to each presenter. However, the authors of the individual comments will remain anonymous. The PIs of each project are instructed to fully consider these summary evaluation comments, as appropriate, into their FY 2005 plans.

Project No.	Project Title, Performing Organization	Average Score	Continued	Dis - continued	Project Completed	Summary Comment
Hydrogen Production and Delivery:						
HPD-1	*Hydrogen Production and Delivery Sub-Program Review*, DOE	3.40				
HPD-2	*Ceramic Membrane Reactor Systems for Converting Natural Gas to Hydrogen (ITM Syngas)*, Air Products	3.40	X			Based on economic analysis provided to date, the focus of this project is central versus distributed production of hydrogen from syngas. FE will continue to fund.
HPD-3	*Integrated Ceramic Membrane System for H_2 Production*, Praxair	3.05	X			In final phase, focus should be on contaminant effects. Project will be completed in FY05.
HPD-4	*Low Cost Hydrogen Production Platform*, Praxair	3.22	X			Need to evaluate impact of new technologies such as membranes on cost projections. Project will be completed in FY05.

Project No.	Project Title, Performing Organization	Average Score	Continued	Dis - continued	Project Completed	Summary Comment
HPD-5	*Defect-free Thin Film Membranes for H_2 Separation & Isolation*, SNL	3.04	X			Focus on real-world operations and simulate system performance. Continuously evaluate suitability of selected materials.
HPD-6	*Autothermal Cyclic Reforming and H_2 Refueling System*, GE Energy	3.25	X			Project will be completed in FY05 with full scale demonstration.
HPD-7	*Development of Supports and Membranes for Hydrogen Separation*, ORNL	3.24	X			It is not clear that this project is at a "critical mass" level. Consider increased funding or combine project with other efforts.
HPD-8	*Adapting Planar Solid Oxide Fuel Cells for Use with Solid Fuel Sources in the Production of Distributed Power*, Ohio University	2.55	X			Consider system integration issues. Do not limit applicability to a single system.
HPD-9	*Maximizing Photosynthetic Efficiencies and Hydrogen Production in Microalgal Cultures*, UC Berkeley	3.39	X			Project has exceeded milestones and current scope will be completed in FY05.
HPD-10	*Biological Systems for Hydrogen Photoproduction*, NREL	3.19	X			Work solidly addresses a major issue arising from biological hydrogen production and addresses a way to circumvent the problem.
HPD-11	*Photoelectrochemical Water Splitting*, NREL	3.01	X			Good progress, but needs a more focused program approach to PEC hydrogen production.
HPD-12	*Photoelectrochemical Hydrogen Production Program*, University of Hawaii	3.06	X			Work will continue with funding from UNLV congressionally directed project.
HPD-13	*Discovery of Photocatalysts for Hydrogen Production*, SRI International	2.42	X			Progress has been slow with many delays due to intellectual property and partner funding concerns. Project will be completed in FY05.
HPD-14	*High Temperature Solid Oxide Electrolyzer System*, INEEL	3.18	X			Need collaboration with industry or university partners. Partially funded by NE in 2005.

Project No.	Project Title, Performing Organization	Average Score	Continued	Dis - continued	Project Completed	Summary Comment
HPD-15	*Renewable Electrolysis Integrated System Development and Testing*, NREL	3.07	X			Well thought-out work with an emphasis on achieving cost targets. Focus on the wind/solar power interface is useful to industry.
HPD-16	*Hydrogen Generation from Electrolysis*, Teledyne	3.07	X			Consider taking H-gen systems to a new level with some "outside the box" developments. Accelerate phase 1 and 2 to get to demo unit sooner.
HPD-17	*Development of Solar-Powered Thermo-Chemical Production of Hydrogen from Water*, University of Nevada	3.16	X			Conclude cycle screening and focus on research and experimentation.
HPD-18	*Moving Toward Consistent Analysis in the HFC&IT Program: H2A*, NREL	3.43			X	Current scope (production and delivery) will be completed in FY04.
HPD-19	*Hydrogen Transition Modeling and Analysis: HYTRANS v. 1.0*, ORNL	2.78	X			Good start on a complex problem. Should be funded at a low level to allow for corrections to the model.
HPD-20	*WinDS-H_2 Model and Analysis*, NREL	2.68	X			Current project scope is complete. Expand to include other intermittents (e.g., solar and biomass).
HPD-P1	*Novel Catalytic Microchannel Fuel Processing Technology*, InnovaTek	3.53			X	Project planned for sucessful completion in FY04.
HPD-P2	*Startech Hydrogen Production*, Startech Environmental	2.43	X			New Project. FY 04 Congressionally directed. Emphasize demonstration of process feedstock flexibility.
HPD-P3	*Water-Gas Shift Membrane Reactor Studies*, NETL	2.87	X			Need to determine effects of contaminants in coal gasification stream. FE to continue funding this work under the Coal to Hydrogen Program.
HPD-P4	*Fluidizable Catalysts for Hydrogen Production from Complex Feedstocks*, NREL	2.80		X		Redirect underlying technology to distributed production of H_2 from bio-derived liquids.
HPD-P5	*Hydrogen from Biomass: Process Research*, NREL	2.88		X		Redirect underlying technology to distributed production of H_2 from bio-derived liquids.

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HPD-P6	*Aqueous Phase Catalyzed Biomass Gasification*, PNNL	2.63	X			Increase funding and initiate collaborations to enhance technology transfer.
HPD-P7	*Hydrogen from Biomass: Catalytic Reforming of Pyrolysis Vapors*, NREL	2.57		X		Redirect underlying technology to distributed production of H_2 from bio-derived liquids.
HPD-P8	*Creation of Designer Alga for Efficient and Robust Production of H_2*, ORNL	3.40	X			Include a go/no-go decision point in 2 or 2.5 years based on whether or not H_2 production increases.
HPD-P9	*Hydrogen Reactor Development and Design for Photofermentation and Photolytic Processes*, NREL	3.07	X			New project in FY04 at low level of funding. Essential for any photo conversion process.
HPD-P10	*Photoelectrochemical H_2 Prod. Using New Combinatorial Chemically Derived Materials*, University of California Santa Barbara	3.02			X	Project team appears to be effective in fully characterizing the materials synthesized by combinatorial methods. Project will be completed in FY04.
HPD-P11	*High Efficiency Electrolysis Materials Research*, SNL	2.77	X			Proof of principle experiments for the synthesis of electrocatalysts need to be conducted early in the project to determine likelihood of success.
HPD-P12	*Low-Cost, High-Pressure Hydrogen Generator*, Giner Electrochemical	3.20	X			Consider feasibility of achieving higher pressures.
HPD-P13	*Hydride Based Hydrogen Compression*, Ergenics	3.07			X	Address cost benefits of hydride compression. Project will be completed in FY04.
HPD-P14	*Technical and Economic Studies of Regional Transition Strategies Toward Widespread Use of H_2 Energy*, UC Davis	3.37	X			Basic model can be easily shared. Need to consider other vehicles in the transition. Include a better understanding of demand and price drivers.
HPD-P15	*Hydrogen Production in a Greenhouse Gas Constrained Situation*, Tellus	2.98	X			Should continue to fund these comparative studies; needed for making sound decisions.
HPD-P16	*Fuel Choice for FCVs: Hydrogen Infrastructure Costs*, TIAX	3.00	X			Project should continue to be funded at a low level so that the model may be updated as technical progress is made.

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HPD-P17	*New York State HI-Way Initiative*, GE Global Research	2.71	X			New project. FY 04 Congressionally directed. Too early to evaluate.
HPD-P18	*EVermont Renewable Hydrogen Fueling Station*, Northern Power Systems	2.55	X			New project. FY 04 Congressionally directed. Too early to evaluate.
HPD-P20	*Photopolymerization/Pyrolysis Route to Microstructured Membrane Development*, LANL	3.00	X			Novel approach that could yield novel materials. As progress is made, collaboration opportunities should be identified.
HPD-P21	*Developing Improved Materials to Support the Hydrogen Economy*, Edison Material Tech Center	2.20	X			New Project. FY 04 Congressionally directed. Solicitation issued and sub-projects to be selected in FY04
HPD-P23	*Hydrogen Generation from Electrolysis*, Proton Energy Systems	3.20	X			This work is properly focused on the wind to H_2 car fueling issue. Would benefit from DFM analysis of the entire system in addition to the planned manufacturing analysis.
Hydrogen Storage:						
ST-1	*Hydrogen Storage Sub-Program Review*, DOE	3.47				
ST-2	*Low Cost, High Efficiency, High Pressure Hydrogen Storage*, Quantum	2.57	X			New project. Continue work aimed at achieving cost target.
ST-3	*Optimum Utilization of Available Space in a Vehicle through Conformable Hydrogen Tanks*, LLNL	2.61	X			Moving in the right direction but needs more focus on experimental work/testing.
ST-4	*Radiolysis Process for the Regeneration of Sodium Borate to Sodium Borohydride*, INEEL	2.32		X		Terminate project based on poor review. Borate conversion to borohydride not clear.
ST-5	*Low Cost, Off-Board Regeneration of Sodium Borohydride*, Millenium Cell	2.45	X			New project. Assess feasibility as part of Center of Excellence, subject to Congressional appropriations. Address regeneration efficiency.
ST-6	*Chemical Hydride Slurry for Hydrogen Production and Storage*, Safe Hydrogen	2.68	X			New project. Define system component mass and volume. Partner with Mg producers.

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ST-7	*Hydrogen Storage by the Reversible Hydrogenation of Liquid and Solid Substrates*, Air Products	2.86	X			New project. Recommend downselecting to 1 or 2 systems after year 1.
ST-8	*Doped Sodium Aluminum Hydride: Fundamental Studies and Development of Related Hydrogen Storage Materials*, University of Hawaii	3.00	X			Continue portions of work as part of Center of Excellence, subject to Congressional appropriations. Start to shift work from sodium alanates to more promosing materials with potential to meet DOE 2010 targets.
ST-9	*Hydride Development for Hydrogen Storage*, SNL	3.32	X			Continue portions of work as part of Center of Excellence, subject to Congressional appropriations. Continue to stress materials discovery work but include engineering sciences studies as a key effort.
ST-10a	*High Density Hydrogen Storage System Demonstration Using NaAlH4 Complex Compound Hydrides*, UTRC	2.84	X			Complete current 1-kg hydrogen prototype work. Shift scope to develop 2nd generation 1-kg prototype with potential to satisfy DOE 2005 systems targets.
ST-10b	*High Density Hydrogen Storage System Demonstration Using NaAlH4 Complex Compound Hydrides*, UTRC	2.83	X			New project (2Q FY04) on exploratory materials development vs. stystem study effort in ST10a. Consider collaboration with Metal Hydride Center of Excellence, subject to Congressional appropriations.
ST-11	*Discovery of Novel Complex Metal Hydrides for Hydrogen Storage through Molecular Modeling and Combinatorial Methods*, UOP	2.98	X			New project (2Q FY04). Stress materials discovery of compounds with potential to meet DOE 2010 system targets. Consider collaboration with Metal Hydride Center of Excellence, subject to Congressional appropriations.

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ST-12	*Sub-Nanostructured Non-Transition Metal Complex Grids for Hydrogen Storage*, Cleveland State University	2.16	X			New project (2Q FY04). Focus on work to prove concept feasibility. Include hydrogen storage measurements in phase 1 of the program. Demonstrate benefits of nanosturctured grid over bulk phase behavior.
ST-13	*Hydrogen Storage in Carbon-based Materials*, NREL	2.72	X			Continue portions of work as part of Center of Excellence, subject to Congressional appropriations. Implement go/no-go decision and shift work to beyond SWNTs.
ST-14	*Standardized Testing Program for Chemical Hydride & Carbon Storage Technologies*, SwRI	3.04	X			Good progress, but should focus on getting highly repeatable results from testing samples. Need to develop testing protocols and disseminate to technical community early.
ST-P1	*Next Generation Physical Hydrogen Storage*, LLNL	2.32	X			Innovative approach to making lighter/strong material for pressure vessels but needs to address practical (cost, manufacturing etc) issues as well.
ST-P3	*Fuel Cell and Hydrogen Research*, University of South Florida	1.48	X			New Project. FY04 Congressionally directed. Too early to evaluate.
ST-P4	*Development of Complex Hydride Hydrogen Storage Materials and Engineering Systems*, University of South Carolina	2.34	X			New Project. FY04 Congressionally directed. Program consists of 5 subprojects addressing hydrogen production, hydrogen storage, and PEM fuel cell components.
ST-P5	*Advanced Manufacturing Technologies for Renewable Energy Applications*, Natl Center for Manf. Sciences	1.64	X			New Project. FY04 Congressionally directed. Need to better define work scope and benefits.
Fuel Cells:						
FC-1	*Fuel Cells Sub-Program Review*, DOE	3.30				

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FC-2	*Integrated Manufacturing for Advanced Membrane Electrode Assemblies*, De Nora	3.11	X			High temperature membrane activities show promise. Project planned for completion in FY2005.
FC-3	*Development of High Temperature Membranes and Improved Cathode Catalysts*, UTC	2.62	X			Project will be redirected to continue development effort and not proceed to stack testing.
FC-4	*Advanced MEAs for Enhanced Operating Conditions*, 3M	3.30	X			Project making good progress. Project planned for completion in FY2005.
FC-5	*Dev.of High-Perf., Low-Pt Cathodes Containing New Catalyst & Layer Structures*, Superior	2.88	X			Catalysts show promise towards meeting Pt loading target.
FC-6	*High-Temperature Membranes*, Case West Reserve University	3.11	X			Continue effort; issue solicitation for new projects.
FC-7	*Electrodes for Hydrogen-Air PEM Fuel Cells*, LANL	2.91	X			Determine threshold of sulfur poisoning.
FC-8	*High-Temperature Polymer Membranes*, ANL	2.64	X			Focus on increasing proton conductivity and durability.
FC-9	*Development of Polybenzimidazole-based, High-Temperature MEAs*, Plug Power	2.83	X			Continue development effort targeted towards stationary applications.
FC-10	*Enabling Commercial PEM Fuel Cells with Breakthrough Lifetime Improvements*, Dupont	3.27	X			Optimize and refine testing methods, mitigation strategies, MEA structure, composition and processing conditions.
FC-11	*MEA and Stack Durability for PEM Fuel Cells*, 3M	3.02	X			Link accelerated tests to lifetime, and accelerate strategies to mitigate decay mechanisms, including catalyst support.
FC-12	*Development of a Low-Cost, Durable Membrane and Membrane Electrode Assembly*, Atofina Chemicals	2.84	X			Continue development of innovative membrane concept.
FC-13	*New Electrocatalysts for Fuel Cells*, LBNL	3.26	X			Funding increased in FY05; concentrate on surface electronic properties
FC-14	*Low-Platinum Catalysts for Oxygen Reduction at PEM Fuel Cell Cathodes*, NRL	2.71	X			Need to focus on non-Pt catalyst development.
FC-15	*Low-Platinum Loading Catalysts for Fuel Cells*, Brookhaven	3.31	X			Funding increased due to promising non-Pt results.

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FC-16	*Development,, Characterization and Evaluation of Transition Metal/Chalcogen Based Cathode Catalysts for PEM Fuel Cells,* Ballard	3.03	X			New project. Need to incorporate Go-No Go decision points.
FC-17	*Novel Approach to Non-Precious Metal Catalysts,* 3M	3.07	X			New project. Good technical expertise. Need clear milestones/targets.
FC-18	*Novel Non-Precious Metals for PEMFC: Catalyst Selection Through Molecular Modeling and Durability Studies*, University of South Carolina	2.80	X			New competitively selected project. Suggest industry collaboration.
FC-19	*Scale-Up of Carbon/Carbon Bipolar Plates,* Porvair	2.91	X			Good progress. Planned completion in May 2005
FC-20	*Cost-Effective Surface Modification for Metallic Bipolar Plates,* ORNL	3.14	X			Collaboration with NREL producing significant results.
FC-21	*Platinum Recycling Technology Development,* Ion Power, Inc.	2.71	X			Consider including other MEA manufacturers. Consider adding go/no go decision point based on cost benefit analysis.
FC-22	*Platinum Group Metal Technology Development,* Engelhard	2.93	X			Recommend including Nafion recovery. Creative approach, but consider potential environmental effects as well.
FC-39	*Atmospheric Fuel Cell Power System for Transportation,* UTC Fuel Cells	2.47	X			Project is planned for completion in early FY2005.
FC-23	*Advanced High Efficiency, Quick Start Fuel Processors for Transportation Application*, Nuvera	2.96	X			Modified to focus on stationary application, "Cost-Effective High Performance Advanced Reforming Module."
FC-24	*Fuel Processors for PEM Fuel Cells,* University of Michigan	2.30	X			Complete development phase in FY2005 and do not build 10kW fuel processor.
FC-25	*Plate Based Fuel Processing System,* Catalytica	2.62	X			Complete development phase in FY2005 and do not build 10kW fuel processor.
FC-26	*Quick Starting Fuel Processors - A Feasibility Study*, ANL	2.85			X	Project successfully completed.
FC-27	*Development Status of a Rapid-Cold-Start, On-Board, Microchannel Steam Reformer*, PNNL	2.38	X			Project redirected to offboard forecourt application.
FC-28	*Catalysts for Autothermal Reforming*, ANL	3.17	X			R&D refocused to include SRM and POX for off-board reforming.

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FC-29	*Water Gas Shift Catalysis*, ANL	3.00	X			Focus on more active, sulfur-tolerant, and thermally and chemically rugged WGS catalysts.
FC-30	*Selective Catalytic Oxidation of Hydrogen Sulfide*, ORNL	2.70	X			Should perform measurements at low pressure of H_2S.
FC-31	*Development of a 50kW Fuel Processor for Stationary Fuel Cell Applications Using Revolutionary Materials for Absorption-Enhanced NG Reforming*, ChevronTexaco	2.95	X			Clarify plan to expand to larger plant; test under "real" conditions; use commercial catalyst to verify approach.
FC-32	*Advanced Buildings PEM FC Project*, IdaTech	2.75	X			Continue development. Ensure technology performance before scale-up.
FC-33	*150 kW PEM Fuel Cell Power Plant Verification*, UTC Fuel cells	2.96	X			Continue reliability development through root cause failure analysis.
FC-34	*Back-up/Peak-Shaving Fuel Cells*, Plug Power	2.95	X			Continue development of stacks, freeze/thaw tolerance, and dry carbide operation. Develop contingency plans.
FC-35	*Economic Analysis of Stationary PEM Fuel Cell Systems*, Battele	2.52	X			Economic Analysis needed to determine benefits.
FC-36	*Fuel Cell Systems Analysis*, ANL	3.09	X			Need to come up with specific plans for next fiscal year.
FC-37	*Development of a Thermal and Water Management (TWM) System for PEM Fuel Cells*, Honeywell	2.56	X			New project. Logical plan. Include input from fuel cell developers.
FC-38	*Fiber Optic Sensors for Fuel Cell Applications*, ORNL	2.95	X			Should focus on laboratory-based research needs for multipoint direction.
FC-40	*Cost and Performance Enhancements for a PEM Fuel Cell Turbocompressor*, Honeywell Sensing	2.86	X			Ensure final design allows for various operating conditions.
FC-41	*Development and Test of the Toroidal Intersecting Vane Machine (TIVM) Air Management System*, Mechanology, LLC	3.16	X			Good progress. Project is planned for completion in FY2005.
FC-42	*Development of Sensors for Automotive PEM based Fuel Cells*, UTCFC	2.75	X			Project is planned for completion in FY2005.
FC-43	*Sensor Development for PEM Fuel Cell Systems*, Honeywell	2.93	X			Continue development, considering environment for transportation applications.

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FC-44	*Neutron Imaging Study of the Water Transport Mechanism in a Working Fuel Cell*, NIST	2.90	X			Concentrate on dissemination of results in the open literature.
FC-45	*Microstructural Characterization of PEM Fuel Cells*, ORNL	3.44	X			Scope and funding expanded in FY05.
FC-46	*Stack Durability on Hydrogen and Reformate*, LANL	3.80	X			Continue steady-state tests and expand tests over drive cycles
FC-47	*Direct Methanol Fuel Cells*, LANL	3.50	X			Focus on fundamentals of key components.
FC-48	*Modeling and Control of a Solid Oxide Fuel Cell Auxiliary Power Unit*, PNNL	2.73	X			Good progress in collecting real vibration data and modeling thermal stresses. Coordinate with other SOFC efforts.
FC-49	*Bipolar Plate-Supported Solid Oxide Fuel Cell "Tuffcell"*, ANL	3.21	X			Focus on stack sealant and electrical contact issues.
FC-P1	*Fuel Cells Vehicle Systems Analysis*, NREL	3.11	X			Work on environmental effects on fuel cell vehicle operation.
FC-P2	*Cost Analyses of Fuel Cell Stacks/Systems*, TIAX	3.24			X	Project completed; new cost analysis solicitation to be issued.
FC-P3	*Development of Novel CO2-Selective Membrane for H_2 Purification*, Ohio State University	3.05			X	Project successfully completed in FY04.
FC-P4	*Microchannel Reformate Cleanup: Water Gas Shift and Preferential Oxidation*, PNNL	2.72		X		Project discontinued due to fuel processing go/no-go decision.
FC-P5	*Effects of Fuel Composition on Fuel Processing*, ANL	2.56		X		Project discontinued due to fuel processing go/no-go decision.
FC-P6	*Development of Advanced Catalysts for Direct Methanol Fuel Cells*, JPL	2.95	X			Project redirected to focus on cathode catalyst.
FC-P7	*Non-Precious Metal Cathode Electrocatalysts*, ANL	2.39	X			Need to show need for continued study of metal oxides.
FC-P8	*Low-Friction Coatings and Materials for Fuel Cell Air Compressors*, ANL	2.70			X	Project successfully completed.
FC-P9	*Montana PEM Membrane Degradation Study*, Montana State University	3.00	X			New Project. FY04 Congressionally directed.
FC-P10	*High Temp. MEA for PEMFC Device Based on SPEKK Blends*, Oxford Perf. Materials	2.60	X			Congressionally directed project (multiyear).
FC-P12	*Polymer Blend Proton Exchange Membranes*, UConn	2.47	X			Concentrate on temperatures up to 120°C and low relative humidity.

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FC-P13	*New Electrocatalysts for Fuel Cells*, Foster Miller	2.30	X			Increase efforts on materials that will have high temperature stability.
FC-P14	*High Temperature Polymer Electrolytes Based on Ionic Liquids*, LANL	2.60	X			Need to consider alternative polymer backbones and work on water solubility.
FC-P19	*New Polymeric Proton Conductors*, LBNL	2.55			X	Project successfully completed in FY04.
FC-P20	*Fuel Cell Reformer Emissions*, TIAX	2.90			X	Project successfully completed in FY04.
FC-P22	*Residential Fuel Cell Demonstration by the Delaware County Electric Cooperative*, Delaware Co.Electric Co-op	3.12	X			New Project. FY 04 Congressionally directed.
FC-P23	*Smart Energy Management Control Systems*, University of South Alabama	2.55	X			New Project. FY 04 Congressionally directed.
FC-P24	*Graphite Based Thermal Management*, ORNL	2.96		X		Project discontinued. This approach will not meet cost targets.
FC-P25	*CO Sensors for Fuel Cell Applications*, LANL	3.10		X		Discontinued due to no-go decision.
Technology Validation:						
TV-1	*Technology Validation Sub-Program Review*, DOE	3.41				
TV-2	*Power Parks System Simulation*, SNL	2.53	X			Need to make compatible with H2A and with mass production projections.
TV-3	*Hawaii Hydrogen Power Park*, State of Hawaii	3.10	X			Design completed. H_2 Power Park to be installed in Oahu.
TV-4	*DTE Energy Hydrogen Technology Park*, DTE Energy	3.00	X			Station to be opened in November 2004.
TV-5	*Hydrogen from Biomass for Urban Transportation*, Clark Atlanta University	3.05			X	Project successfully completed.
TV-6	*Alkaline Fuel Cell-Battery Hybrid Systems with Ammonia or Methanol as H_2-Supply*, Apollo	2.20			X	Project completed, but had poor program relevance.
TV-7	*UNIGEN® Regenerative Fuel Cell For Uninterruptible Power Supply*, Proton	2.64			X	Project successfully completed.
TV-8	*Controlled H_2 Fleet & Infrastructure Analysis*, NREL	3.32	X			Continue funding. Focus on real world analysis.
TV-9	*Development of a Turnkey H_2 Refueling Station*, Air Products	2.93	X			Achieved 2005 target for purification. Continue effort.

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TV-10	*Development of a Natural Gas-to-Hydrogen Fueling System*, GTI	3.02	X			Complete validation of refueling station. Consider collaboration with Air Products on dispenser.
TV-11	*Novel Compression and Fueling Apparatus to Meet Hydrogen Vehicle Range Requirements*, Air Products	3.05	X			Complete validation of novel isothermal compression. Publish performance data when available.
TV-12	*Auto-Thermal Reforming Based Refueling Station at SunLine*, Hydradix/SunLine	2.95			X	Hydradix completed installation. Operation of unit with safety and data collection continues. Publish performance data for generator.
TV-13	*R&D of a PEM Fuel Cell, Hydrogen Reformer, and Vehicle Refueling Facility*, Air Products	2.96	X			Successfully demonstrated meeting co-production target. Need to validate.
TV-14	*LAX Airport Hydrogen Fueling Station - Small Footprint H_2 Capability at the Corner Filling Station*, Praxair	3.13	X			Groundbreaking occurred in June 2004. Station to be completed by November 2004. Provide data on cost and efficiency.
TV-15	*Hydrogen and Natural Gas Blends: Converting Light and Heavy Duty Vehicles*, Collier Technologies	2.90	X			Project to convert nine trucks within six months. Consider hybrid technology.
TV-16	*Fuel Cell Powered Underground Mine Loader Vehicle*, Vehicle Projects	2.95	X			Congressionally directed project (multiyear). Project to be completed in 2005. Consider other applications for this technology configuration.
TV-P1	*Validation of an Integrated System for a Hydrogen-Fueled Power Park*, Air Products	2.80	X			Successfully completed design (phase 1). Include demonstration in next phase.
TV-P2	*Fuel Cell Installation and Demonstration Project In Gallatin County, Montana*, Zoot Enterprises	2.33			X	FY 03 Congressionally directed project. Project completed. However Zoot is currently experiencing operational difficulties. Continuation beyond funded scope not recommended.
TV-P3	*Global Assessment of Hydrogen Based Technologies*, University of Alabama	2.60		X		FY 03 Congressionally directed project. Include industrial partners in existing effort.

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TV-P4	*Hydrogen Power Park Business Opportunities Concept Project*, Pinnacle	3.53	X			Modeling activity indicated four potential power park options. Proceed with implementation of APS system.
TV-P5	*NextEnergy Microgrid and Hydrogen Fueling Facility*, NextEnergy	2.88	X			FY03 Congressionally directed project. Proceed with development of microgrid system. Conduct in depth risk and safety analysis.
TV-P7	*Hydrogen Fuel Project*, RTC of Washoe County	2.50	X			New Project. FY 04 Congressionally directed. Work scope needs definition.
TV-P9	*Renewable Hydrogen Fueling Station System*, University of Nevada-Las Vegas	3.00	X			Congressionally directed project (multiyear). Increase collaboration with other Nevada fueling station.
TV-P11	*Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems*, Hawaii Natural Energy Inst.	3.20	X			New Project. FY 04 Congressionally directed. Develop quantitative phased, go/no go decision criteria and contingency plans.
Safety Codes and Standards:						
SCS-1	*Safety and Codes & Standards Sub-Program Review*, DOE	3.46				
SCS-2	*Hydrogen Codes and Standards*, NREL	3.55	X			Continue funding in FY2005 and sustain important collaborations.
SCS-3	*Electrochemical Sensors for PEMFC Vehicles*, LLNL	3.04	X			Focus on cost, durability, and drift for FY2005.
SCS-P1	*Interfacial Stability of Thin Film H_2 Sensors*, NREL	2.89	X			Good laboratory results under ideal conditions will be explored under more demanding conditions.
SCS-P2	*Codes & Standards Analysis*, University of Miami	3.50	X			Will continue for FY2005 and expand scope as funding alter.
Education:						
ED-1	*Education Sub-Program Review*, DOE	3.60				
ED-2	*Baseline Knowledge Assessment*, ORNL	3.48	X			Continue funding in FY05 to complete project.
ED-P1	*Demonstration of a PEM Fuel Cell with On-Site Generation of Hydrogen*, NC State University	2.69	X			Project should be completed in FY05 with no new funding required.

Project No.	Project Title, Performing Organization	Average Score	Continued	Dis - continued	Project Completed	Summary Comment
ED-P2	*Washington State Fuel Cell Education and Demonstration Program*, Central Washington Univ.	3.92			X	Project successfully completed in FY04.
ED-P3	*Development and Dissemination of PEM Fuel Cell Educational Modules*, University of North Dakota	3.17	X			Project should be completed in FY05 with no new funding required.
ED-P4	*Lansing Community College Alternative Energy Center*, Lansing Community College	3.29	X			New Project. FY04 Congressionally directed.
ED-P5	*Shared Technology Transfer Project*, Nicholls State University	2.08	X			New Project. FY04 Congressionally directed.

We would like to express our sincere appreciation to the members of the Peer Review Panel. It is they who make this report possible, and upon whose comments we rely to help make programmatic budget decisions for the new fiscal year. Thank you for participating in the FY 2004 Hydrogen Program Merit Review and Peer Evaluation meeting.

We look forward to your participation in the FY 2005 Merit Review and Peer Evaluation which is scheduled for May 23-26, 2005 in the Washington, D.C. area.

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